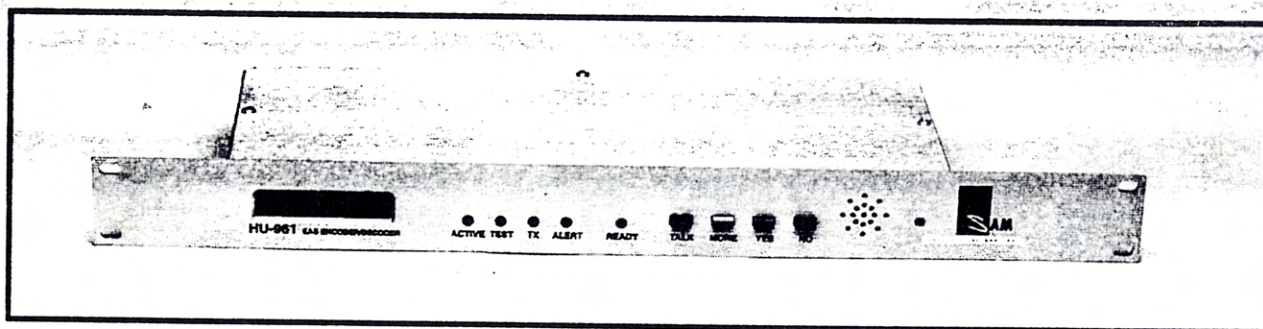


Installation & Operations Manual



HU-961 EAS Encoder/Decoder

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INTRODUCTION

Product Overview....This Operator's Manual provides installation and operation information on the HU-961 Emergency Alerting System (EAS) message encoder/decoder. The HU-961 design meets, or exceeds, the requirements detailed in Part 11 of FCC rules for the National EAS. The decoder portion of the HU-961 accepts three EAS message sources and provides visual and audible indication to the user. The encoder section of the HU-961 enables the re-transmission, or generation, of EAS messages.

Manual Overview....This Operator's Manual is divided into five major sections: Product Description, Unit Setup, Unit Operation, Diagnostics, and Enhanced Operation. Product Description provides a system overview and physical description of the HU-961. Unit Setup describes the steps necessary in preparing the HU-961 for its primary function of monitoring EAS messages. The Unit Operation section explains the normal HU-961 front panel and the host computer operating procedures. The Diagnostic section gives instructions on what to do if things do not appear normal. The Enhanced Operation section describes configurations that will enable the full capability of the HU-961. Appendices provide additional information that may be valuable in the integration of the HU-961 into the radio station.

WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. reorient the receiving antenna
2. relocate the HU-961 with respect to the receiver
3. move the HU-961 away from the receiver
4. plug the HU-961 into a different outlet so that the HU-961 and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to identify and Resolve Radio-TV Interference Problems." This booklet is available from the U. S. Government Printing Office, Washington, D. C. 2042, Stock No. 004-000-00345-4.

PRODUCT DESCRIPTION

System Overview....The HU-961 is your station's link into the Emergency Alerting Systems. The unit contains a decoder section that receives EAS messages from up to three sources and interprets them for audible and visual display. The other major part of the HU-961 is the encoder section that generates and transmits EAS messages for your station.

What is an EAS message?....An EAS message is information generated by a Federal, or local, Government Agency that is pertinent to the public. This information could range from a Severe Thunderstorm Warning to a Tornado Watch to a Hazardous Material Accident. It consists of four major parts transmitted in the following order: the Header, the Two Tone Attention Signal, the Voice Text, and the End of Message (EOM). Both the Header and the EOM are digitally encoded signals that allow encoders to communicate with the decoders. The attention signal and voice text part are for human use and carry the responsibility of getting the warning to the public. It is the responsibility of the cognizant agency to generate the EAS message and have it to filter through the system.

The message is received from a minimum of two sources, usually other radio or TV stations. Radio receiver audio outputs are connected to the back of the HU-961, as discussed in the Unit Setup section. Figure 1 provides a system diagram showing the HU-961 integrated into the station. The Header part of the EAS message received by the HU-961 contains detailed information concerning an event that may be occurring (i.e., Tornado Watch, Flash Flood, Hurricane Warning, etc.) and the county, or counties, that may be affected. The event portion is a three digit PIL Code. For example, FLW is the PIL code for a Flood Warning. Appendix A provides a complete list of PIL codes used by the originating agencies. The affected county is designated by a six digit code. For example, the six digit code for Blount County in Tennessee is 047009 (A complete list of all county codes is in the HU-961 Setup Software). With this information, the HU-961 and other decoders are able to "know", prior to the transmission of the voice text, what the voice text message contains. In addition, the HU-961 can be programmed by its user to perform tasks based entirely on the precise contents of any and all EAS messages. Some of these tasks are: ignore the message, signal that the message is important, direct the voice text to the transmitter, re-transmit the message, or indicate the message is a test.

Each EAS message that is received has an effective time. The effective time is the duration of time that the event (Tornado Watch) is active. The HU-961 recognizes this effective time and maintains the message information in an active file for the complete effective duration

How is the HU-961 programmed to response to EAS messages?....The heart of an EAS message is an event coupled with one or more counties. The user can create and store in the HU-961 a "TERM" which consists of a single event and a single county. A maximum of sixteen TERMS can be stored in a HU-961. When an EAS message is received, the HU-961 compares the message with the stored TERMS and attempts to find a match. That is, does a specific TERM match both the event and county in the message. If so, the EAS message becomes a HOT MESSAGE. Along with each TERM, the user is given the opportunity to program several action

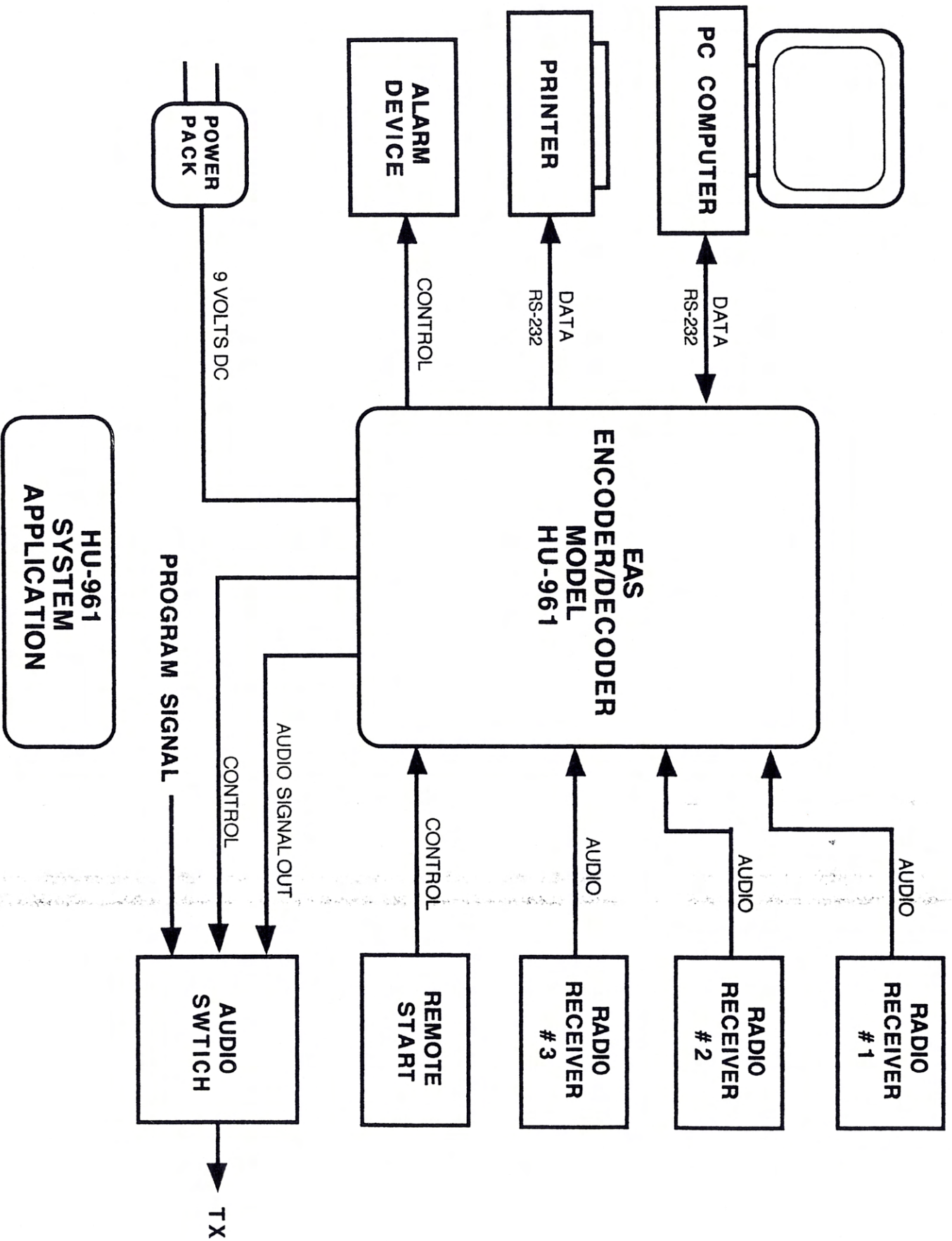


Figure 1

items (stated above) that are desired if and when the HU-961 receives and decodes a HOT MESSAGE.

Re-transmission of the EAS message is a major function of the HU-961. All active EAS messages received by the HU-961 are recorded and stored in the active file. For re-transmission of the message, the HU-961 encodes the message and sends it out with an ID code on the end. In addition, the HU-961 enables the user to generate their own EAS message. Generation of EAS messages is under HU-961 password control. This prohibits unauthorized generation of messages.

Physical Description....The HU-961 is a 19 inch rack mountable unit that provides the user visual and audible access to EAS messages via front panel controls. All external interfaces are provided through connectors located on the rear panel of the HU-961.

Figure 2 is an illustration of the front panel of the HU-961. The front panel contains a speaker, four push button control keys, 1 green Light Emitting Diode (LED) lamp, 4 red LED lamps, and a backlit viewing screen. This panel serves as the user interface for manual interaction with the HU-961.

Message Display....The viewing screen on the front panel is a backlit liquid crystal display (LCD) that displays messages to the user. It is used to convey as a minimum the following information:

1. In the idle, or monitoring, mode the display shows "HU-961 Ready"
2. When receiving an EAS message, the message is scrolled across the display
3. When commanded, scrolling of the last active message

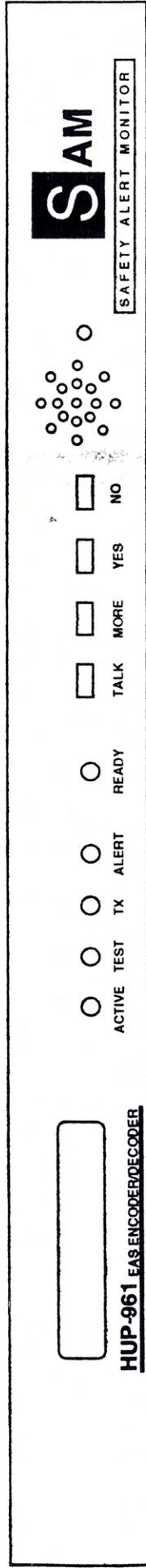
IMPORTANT NOTE: The viewing screen is only backlit when needed for message display.

The green LED (labeled as Ready) indicates the monitor mode of the HU-961. The LED can have the following states:

1. On - Indicates the HU-961 is in the Automatic Monitor Mode
2. Blinking - Indicates the HU-961 is in the Override Monitor Mode
3. Off - Indicates the HU-961 is off-line receiving information from the computer.

IMPORTANT NOTE: This is applicable only when power is on and the HU-961 is connected to an external computer.

The four red LED lamps are designated as ALERT, TX, TEST, and ACTIVE, respectively. These four LED lamps turn on in a ripple sequence when the HU-961 is receiving a valid EAS message. Each LED lamp provides HU-961 status:



INDICATOR DEFINITIONS

ON SOLID....Indicates the HU-961 is in the Automatic Monitor Mode.
BLINKING....Indicates the HU-961 is in the Override Monitor Mode.

ON SOLID....Indicates the HU-961 has received a VALID message and is processing it.
BLINKING....Indicates the HU-961 has diagnosed a System Fault.

ON SOLID....Indicates the HU-961 is transmitting or receiving an EAS Message.

ON SOLID....Indicates the HU-961 has received a VALID TEST Message.

ON SOLID....Indicates the HU-961 has unexpired received messages in Memory.

RIPPLE.....Indicates the HU-961 is receiving a VALID message.

SWTICH BUTTON DEFINITIONS

TALK

Commands HU-961 to speak a Request or Report

MORE

Commands HU-961 to select the next Command Request Level.

YES

Positive response to a Command Request.

NO

Negative response to a Command Request.

KEY COMBINATIONS

NO-MORE

Command to terminate a command or exit to a higher Command Request Level.

NO-TALK

Command to silence the speaker.

HU-961 Encoder/Decoder
Front Panel Definitions

ALERT LED

On Solid - Indicates the HU-961 is receiving an EAS message
Blinking - Indicates the HU-961 has diagnosed a System Fault

TX LED

On Solid - Indicates the HU-961 is transmitting or receiving an EAS message

TEST LED

On Solid - Indicates the HU-961 has received a valid test message that has an effective time that has not been reached.

ACTIVE LED

On Solid - Indicates the HU-961 has unexpired EAS messages in memory. An unexpired message is an EAS situation that is still in effect.

The four push button control keys are identified as NO, YES, MORE, and TALK, respectively. Each key provides a specific function in the command of the HU-961.

TALK (Red Key)

Commands the HU-961 to speak a Request or Report over the speaker

MORE (Blue Key)

Commands the HU-961 to select the next Command Request Level

YES (Gray Key)

Allows the user to provide a positive response to a Command Request

NO (Black Key)

Allows the user to provide a negative response to a Command Request

There are two dual key operations available with these push buttons. A dual key operation is defined as when two keys are pushed and released at the same time. The following operations are available:

NO and MORE

Commands the HU-961 to terminate a command or exit to a higher Command Request Level

NO and TALK

Commands the HU-961 to silence the speaker

Speaker....The speaker allows the user to hear stored EAS messages or monitor live audio. There is a front panel speaker volume adjustment control accessible to the user.

Figure 3 illustrates the rear panel of the HU-961. There are four connectors and one signal adjustment position used to interface the HU-961 to a Printer, a Host PC, power, and analog and digital signals. **IMPORTANT NOTE:** A host PC is necessary to properly setup the HU-961.

Power....This connector jack receives the power plug attached via a six foot cord to the HU-961's Power Pack. The HU-961 operates on DC voltage in a range from 9 to 14 volts DC. The DC current load is approximately 200 milliamps.

COMM1 and COMM2....RS 232 communication ports for remote access to the HU-961. The standard configuration connects COMM1 to a printer and COMM2 to a host PC. The header information from all EAS messages received by the HU-961 is sent to the printer for a historical hard copy. In addition, information from the EAS messages is sent to the host PC. Appendix B provides the format for the messages sent to the host PC port. This information will enable the user to develop external control capabilities.

I/O Connector....Twelve position main signal connector providing system ground, digital input and output signals, and analog input and output signals.

Adjustment of the Audio Output from the I/O connector is made via the **Output Level Potentiometer**. The adjustment range is -40 dbm to +8 dbm.

UNIT SETUP

The setup procedures for the HU-961 are divided into two major parts. The first part is the physical installation of the HU-961.

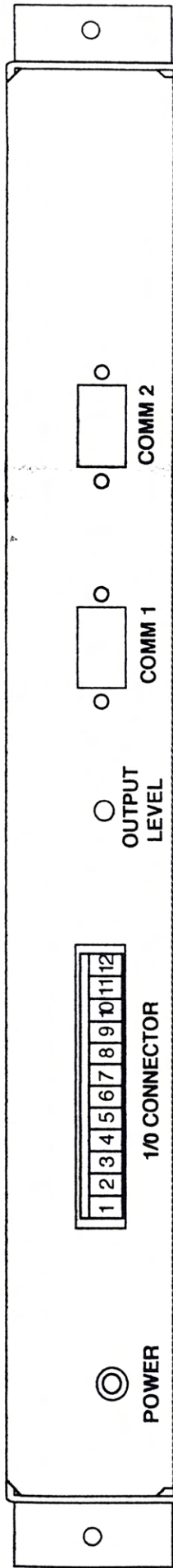
Physical Installation....After the user removes the HU-961 from its shipping container, the following steps are performed to install the unit. **HELPFUL HINT:** Save the HU-961 shipping container for return of the unit if necessary.

1. Mount the HU-961 into a 19 inch rack. There are four mounting holes on the HU-961, two on each side.
2. Install the HU-961's power supply adapter into the plug located on the rear panel. **HELPFUL HINT:** To ensure proper operation, the HU-961 chassis should be grounded to earth ground.
3. Install a shielded cable pair from the first message source (FM, AM or TV signal) to I/O connector pins 11 and 12 of the HU-961, as shown in Figure 3. The shield should be grounded at the source end. All HU-961 audio receivers are 600 ohm balanced inputs.
4. Installation of the second message source is to connector pins 9 and 10 of the HU-961 via a shielded cable pair.
5. If a third message source is available, wire it to connector pins 7 and 8.
6. Audio output for HU-961 transmission of EAS messages is wired to I/O connector pins 5 and 6. This is an 8 ohm output with a rear panel level adjustment. This signal is wired from the HU-961 to a switch box, or some other input, for routing to the station transmitter.
7. Once the audio pairs are wired to the I/O connector, connect a cable with a 9 pin female connector to COMM1 to provide printer capability. Figure 3 details the pin out connection required. The serial data format is 8 data bits, no parity, one stop bit, and 1200 baud.
8. Connection to the host PC is through the 9 pin connector labeled COMM2. Figure 3 details the pin out connection required. The serial data format is 8 data bits, no parity, one stop bit, and 2400 baud.

Performance of the above steps completes the basic installation of the HU-961. At this time the unit is ready for power up and setup through the Host PC. Upon insertion of the power adapter into a 120 VAC outlet, the HU-961 will go through a power up routine and indicate "HU-961 READY" on the viewing screen when operational.

In addition to the basic installation, other HU-961 external interfaces that can be installed are as follows:

1. Digital output (Control Out) (connector pin 3) - This is a normally open contact output with a maximum rating of 24 VDC at 0.5 amps. This programmable signal is active low (ground) from the receipt of the EAS header to the receipt of the EAS end of message code.



CONNECTOR DEFINITIONS

POWER..... Input Power Jack. Requirement is 9 to 14 volts DC.

I/O CONNECTOR..... Main Signal Connector.

- Pin 1...System Ground
- Pin 2...Digital Output (Alert Out)
- Pin 3...Digital Output (Control Out)
- Pin 4...Digital Input (Remote Start)
- Pin 5 & 6...Analog Output
- Pin 7 & 8...Analog Input (Channel 3)
- Pin 9 & 10...Analog Input (Channel 2)
- Pin 11 & 12...Analog Input (Channel 1)

NOTE: I/O Connector is removable.

COMM 1 RS-232 Communications Port (Printer Configuration)

- Pin 2...Tx Data Out
- Pin 3...Rx Data In
- Pin 4...DTR In
- Pin 5...Signal Ground

COMM 2 RS-232 Communications Port (Host PC Configuration)

- Pin 2...Tx Data Out
- Pin 3...Rx Data In
- Pin 7...RTS In
- Pin 8...CTS Out
- Pin 5...Signal Ground

SIGNAL AJUSTMENT

OUTPUT LEVEL.... Adjustment (one turn pot) for signal level of Analog Output

Range... -40dbm to +8 dbm

**HU-961 Encoder/Decoder
Back Panel Definitions**

2. Digital output (Alert Out) (connector pin 2) - This is a normally open contact output with a maximum rating of 24 VDC at 0.5 amps. This programmable signal is active low (ground) from the receipt of the EAS header to the receipt of a front panel or host PC command.
3. Digital Input (Remote Start) (connector pin 4) - This input has a 20 kilohm input impedance and accepts a voltage level range of 0 to 5 volts DC. Upon receipt of an active low (ground) control signal, the HU-961 transmits the last received message.

Host PC Setup.... The second major part of setup for the HU-961 is the creation and download of the configuration specific to your location. Included with the HU-961 is software that will enable the user to create this site specific configuration. The following steps are based on limited computer knowledge and detail the installation of the software.

1. Place the HU-961 software disk in your computer's 3.5" floppy drive. This may be configured as drive A or drive B in your computer. For the rest of this procedure, the discussion will refer to using drive A. If your floppy drive is labeled B, substitute "B" at every location the manual refers to "A".
2. At the DOS prompt (C:\>), select the floppy drive by typing "A:\"
3. At the drive A prompt (A:\>), type in "install". **IMPORTANT NOTE:** The HU-961 software operates on a PC with a 286 processor, or newer, and sets up the directory HU961D on your computer. It is necessary to exit all application programs (including Windows) to ensure there is at least 560 kilobytes of free RAM memory. The amount of free RAM memory can be determined by typing "mem" at the DOS prompt.
4. At the HU961D prompt (C:\HU961D>), type in "HU96".
5. The "HU-961 EASy Management Software" window screen appears and the user is ready to setup the HU-961.

HELPFUL HINT: The HU-961 setup procedure is straightforward and prompts the user with explanations on each menu screen. Following the menu from start to finish allows the user to program all the necessary features of the HU-961. The software allows selection of commands through the use of a mouse, or keyboard selection. When using the mouse, move to the desired location and click the mouse to select the option.

When using the keyboard, the user can press the bolded letter associated with each menu choice to implement that command. Several helpful things to remember are the use of the TAB, SPACEBAR, and ARROW keys. The TAB key allows the user to advance through each of the options on a screen. For example, the first screen has three options; enter password, OK, or cancel. Depression of the TAB key allows the user to alternate between each of the three choices. Pressing the ENTER or SPACEBAR key selects the highlighted option. On some screens, once the user tabs to an option there are additional choices that can be made. By using the ARROW UP and ARROW DOWN keys, the user can select these sub-options.

Another helpful hint to remember is the use of the ALT key on the keyboard. This key is especially important if the computer does not have a mouse. On the main HU-961 menu screen, there are three major categories available on the top row of the display: FILE; SETUP; and

REAL TIME OPERATION. Holding down the ALT key and the first letter of one of the three major categories will select that software option. Once the option is selected, the ARROW keys can be used to select the appropriate operation.

Password Entry....The first screen of the EAS management software requires the entry of the HU-961 setup password. The default password is "123". With the proper password, the user is walked through the HU-961 setup procedures.

Communication Port Initialization....After the initial setup screen, the next screen provides the user the choice of four COMM ports from the host PC available for connection to the HU-961.

IMPORTANT NOTE: This is the most important part of the setup procedure. The HU-961 has been designed to interface with a cable with a 9-pin male connector for COMM2. The cable to the PC must be a straight through configuration where pin 1 is tied to pin 1, pin 2 to pin 2, pin 3 to pin 3, etc. A 6 foot cable with 9 pin connectors on both ends is provided. The male end of the cable plugs into the COMM2 connector of the HU-961 unit. If your computer accepts only 25 pin connectors, a 9 pin to 25 pin adapter can be purchased at any electronic parts store.

On this screen select the COMM port associated with the connector where the HU-961 cable is installed. Ensure that no other devices are connected to the same COMM port; such as a mouse, or internal modem. Once the COMM port selection is made, select the TEST CONNECTION option verifying the PC can communicate with the HU-961. The HU-961 software will automatically setup the COMM protocol necessary to communicate with the HU-961. **IMPORTANT NOTE:** The most common problem during this phase of the setup is that the cable is not pin to pin compatible, or the cable is not connected to the correct location.

Station Identification Programming....After installation and checkout of the cable, the user is prompted to enter their station ID, or call sign. This code will be used in transmitting the header message, when the station re-transmits an EAS message.

Change Password....The user has the opportunity to change the password authorizing access to this setup program. The password is limited to three digits between 0 and 9.

Setup of Originator Code....The originator code is the identifier for the originating agencies that will transmit message the HU-961 will receive. There are five options that can be programmed:

1. Broadcast System
2. Civil Authorities
3. Emergency Action Network
4. National Weather Service
5. Primary Entry Point

EOM Timeout....This timeout is the amount of time the HU-961 will wait before it terminates an incoming EAS message if it does not receive a valid EOM code. The default for the EOM timeout is 120 seconds (2 minutes) and can be set for up to 240 seconds (4 minutes).

Message Source Input Selection....The next screen requests the user to identify the number of HU-961 EAS message sources. The HU-961 can be configured to accept up to three message sources. **HELPFUL HINT:** Use of the TAB and SPACEBAR keys allow the user to select an input port. **IMPORTANT NOTE:** The HU-961 monitors any active input ports and will blink the ALERT LED if no audio signal is detected on the port, therefore, it is important that the user properly ID all inputs that are used.

TwoTone Time Duration....The user sets the duration of the TWOTONE code sent out during a re-transmission. The valid range for the tone is 8 to 25 seconds, with a default of 25 seconds.

Counties Monitored....The next screen requests the user to select all counties that the HU-961 monitors to a maximum of 50. The software allows the user to select any of the 50 states and any county in the 50 states. Typically, the user selects the individual counties in their area. **IMPORTANT NOTE:** Include all counties on this list from where the user would expect to receive an EAS message. Keep a copy of this list near the HU-961 for reference.

Time and Date....The next screen allows the user to set the time and date for the HU-961 corresponding with their listening area.

TERM Message Generation....The last set of screens associated with the EASy Management Software is the most important part of the setup procedure. These screens allow the user to establish the TERM messages that the HU-961 will monitor and how it will react upon receipt of the EAS message. The setup of a TERM constitutes the configuring of four areas: the event; the identification of the county being monitored; what to do with the message; and how to handle re-transmission of the message. There is a screen for each item. Selecting the NEXT button from the screen display allows the user to advance through the configuration process.

Event Setup....There are approximately 33 events that can make up a TERM. The default setting for the screen is no events. The user adds an event by selecting the "ADD" button on the menu screen. The software then provides a list of possible events to choose. By using the UP and DOWN ARROW keys, the user can cycle through the available choices. Pressing the SPACEBAR or ENTER keys selects the event. The software cycles back to the event screen and the user is able to add another event or delete an event. Deletion of an event is made by selecting "DEL" button on the menu screen. Once the user is finished choosing an event, the selection of the "NEXT" button allows you to go to the next screen.

Applicable County....This screen allows the user to enter the county associated with the event being monitored. This is done by choosing the "ADD" button and identifying the applicable state. After highlighting the applicable state, pressing the ENTER key on the keyboard displays all the counties in the specified state. The UP and DOWN ARROW keys allow the user to browse through the available selections. Pressing the ENTER key associates the highlighted county with the associated event. **IMPORTANT NOTE:** If the user wants to monitor the same event in two different counties, two TERM messages have to be set up in the computer.

Hot Message Setup....Each TERM that matches an incoming EAS message can have up to three actions associated with it. The first option is the transmitting of a Voice Announcement. The other two options allow the user to selectably control the digital output signals for each EAS Message. Use of the UP and DOWN ARROW keys allow the user to highlight the desired option. Depression of the keyboard SPACEBAR enables or disables the option. An "X" in the parenthesis enables the option, while no "X" disables the option.

Priority Level Setup....There are three priority levels that range from immediate to manual control of re-transmission. The priority one level provides immediate re-transmission of the message and does not require any manual intervention. Re-transmission of priority two identified messages is delayed for fifteen minutes. The user is given the opportunity to re-transmit the message any time during this fifteen minute window by front panel control. If the message has not been sent by the end of the fifteen minutes, the HU-961 will automatically re-transmit the message. Messages labeled for priority three processing will not be re-transmitted by the HU-961. It will be the responsibility of the user to re-transmit the message.

The above four steps can be repeated for up to 16 TERMS placed into the HU-961 memory. Once all the appropriate TERM conditions are programmed, the user is given the opportunity to download the configuration to the HU-961 or discontinue the configuration procedure without changing the HU-961. When PC downloads the new configuration to the HU-961, the unit's READY LED extinguishes until the update is complete.

UNIT OPERATION

The HU-961 receives an EAS message from up to three different radio sources. The receipt of this EAS message consists of four major parts that are decoded by the HU-961. The first part of the message is the header information that consists of the originator code, TERM information, effective time, and ID code. The originator code is the agency that generated the message. Appendix B details a partial list of agencies that may generate a EAS message. The TERM information is the event information and location of the event. The third part of the header is the effective time that the message will be active. The effective time is in increments of 15 minutes up to 60 minutes and increments of 30 minutes from 60 minutes until 6 hours and 30 minutes. After the effective time information, a time stamp appears in the header and is generated by the originating agency. The format for the time stamp is seven digits with a three digit Julian date and four digit Zulu time. The final part of the header is the ID code of the transmitting station.

The second part of an EAS message is the two tone signal. The two tone signal is a signal provided to draw attention to the fact that a situation has occurred.

The third, and most important, part of the EAS message is the audio message that identifies the event and counties affected. This message is generated by the originating agency and re-transmitted through the EAS system. The HU-961 digitally records the voice message for-re-transmission.

The final part of the EAS message is the end of message code.

Front Panel Operation....Primary operation of the HU-961 is from the front panel push button control keys and LED lamps. When a new EAS message is received, the four red LED lamps go through a ripple sequence and the message is scrolled across the backlit viewing screen. Pressing the TALK key stops the ripple sequence and turns on the ALERT LED only. The message display then details the type of message "EAS MESSAGE" or "HOT MESSAGE". If programmed, the HU-961 speaker provides an audible indication for Hot Messages. **HELPFUL HINT:** See Host PC Setup for programming options.

If the user does not see the red LED ripple sequence, a solid on ACTIVE LED signifies that an active EAS message has been received. To access this message, the user presses the TALK control key for a list of applicable options. Each option requires a depression of the YES or NO control key to the question transmitted over the speaker. **HELPFUL HINT:** There is approximately a five second window in which the next key should be depressed for acknowledgment of commands.

The three options available are:

1. **REPORT ACTIVE MESSAGE** - Do you want to hear the header information of the last active EAS message received?
2. **MONITOR AUDIO** - Do you want to monitor the present incoming audio signal?

3. DISPLAY MESSAGE - Do you want to display the message on the backlit viewing screen?

The other user option is pressing the MORE key. Figures 4 and 5 provide a flow chart of the options available once the MORE key is depressed.

When there is no ACTIVE LED lamp on and the HU-961 is monitoring the EAS message sources, the display shows "HU-961 Ready". Depression of the TALK key transmits the Julian date and ZULU time over the speaker. Depression of the MORE key allows the user to access three different levels of commands. Two of the three levels are available to any user within the facility. The third level is password protected and access only available to authorized users.

The first depression of the MORE key gives the user access to the following areas. **HELPFUL HINT:** The viewing screen will display "Circle 1" and questions are answered by depression of the YES and NO keys.

REPORT LAST MESSAGE	Allows the user to hear the header information of the last active EAS message received.
DISPLAY LAST MESSAGE	Displays the header information of the last active EAS message on the backlit viewing screen. HELPFUL HINT: While the message is scrolled across the viewing screen, depression of the NO key stops the scrolling. Depression of the YES key, re-starts the message scrolling.
SELECT TEST MESSAGE	Enables the user to transmits out the audio output the weekly test message.
MONITOR INPUT	Enables the user to monitor the live audio coming from one of three EAS message sources. HELPFUL HINT: Anytime the speaker is transmitting audio, depression of the NO and TALK keys will terminate the speaker output.

If there are any active messages, the following two options are available for the user:

REPORT ACTIVE COUNT	Reports the number of active message in memory
REPORT ACTIVE MESSAGES	Allows the user to select one of the active EAS message headers for transmission over the HU-961 speaker

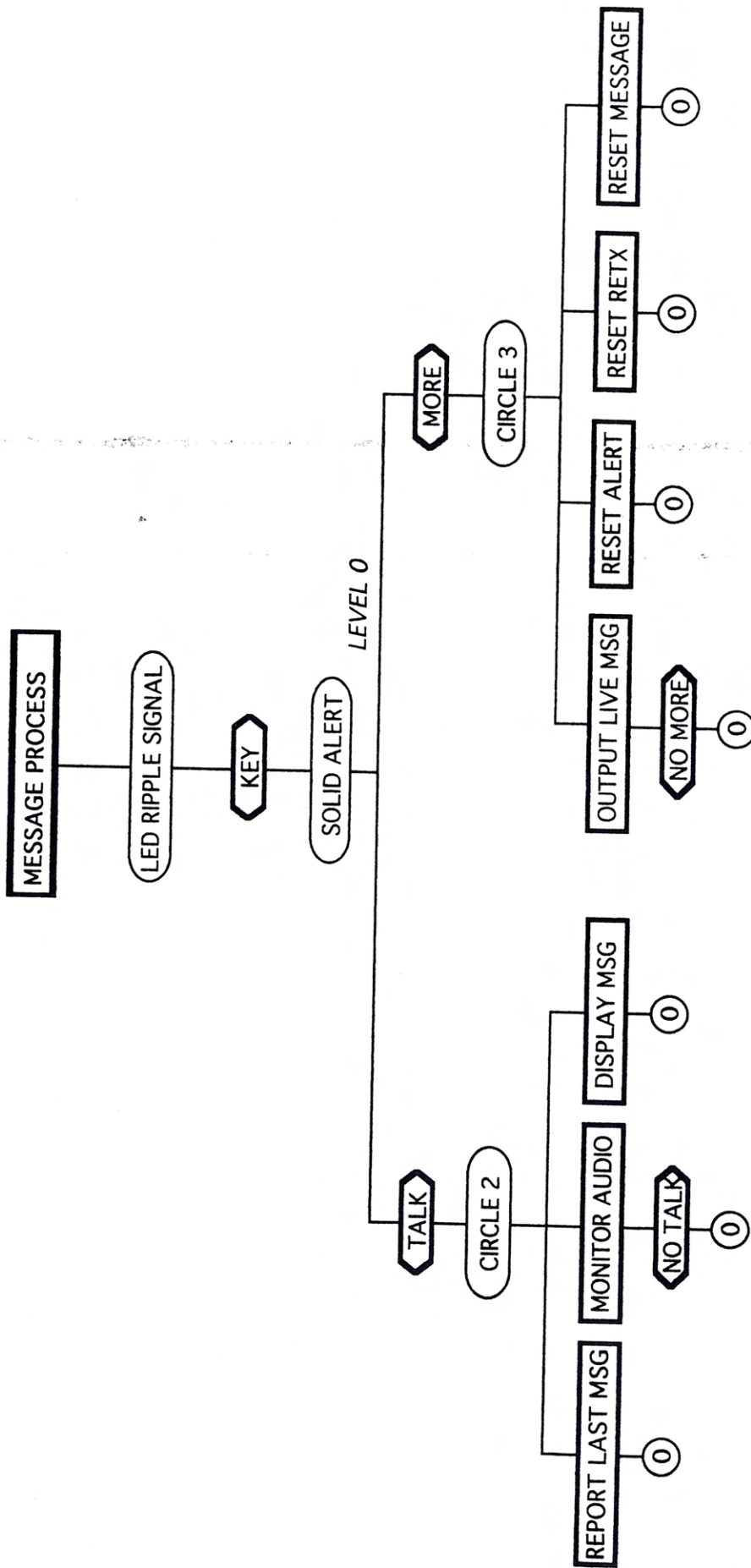


DIAGRAM DEFINITIONS

NO TALK → Indicates a Panel Key response is requested.

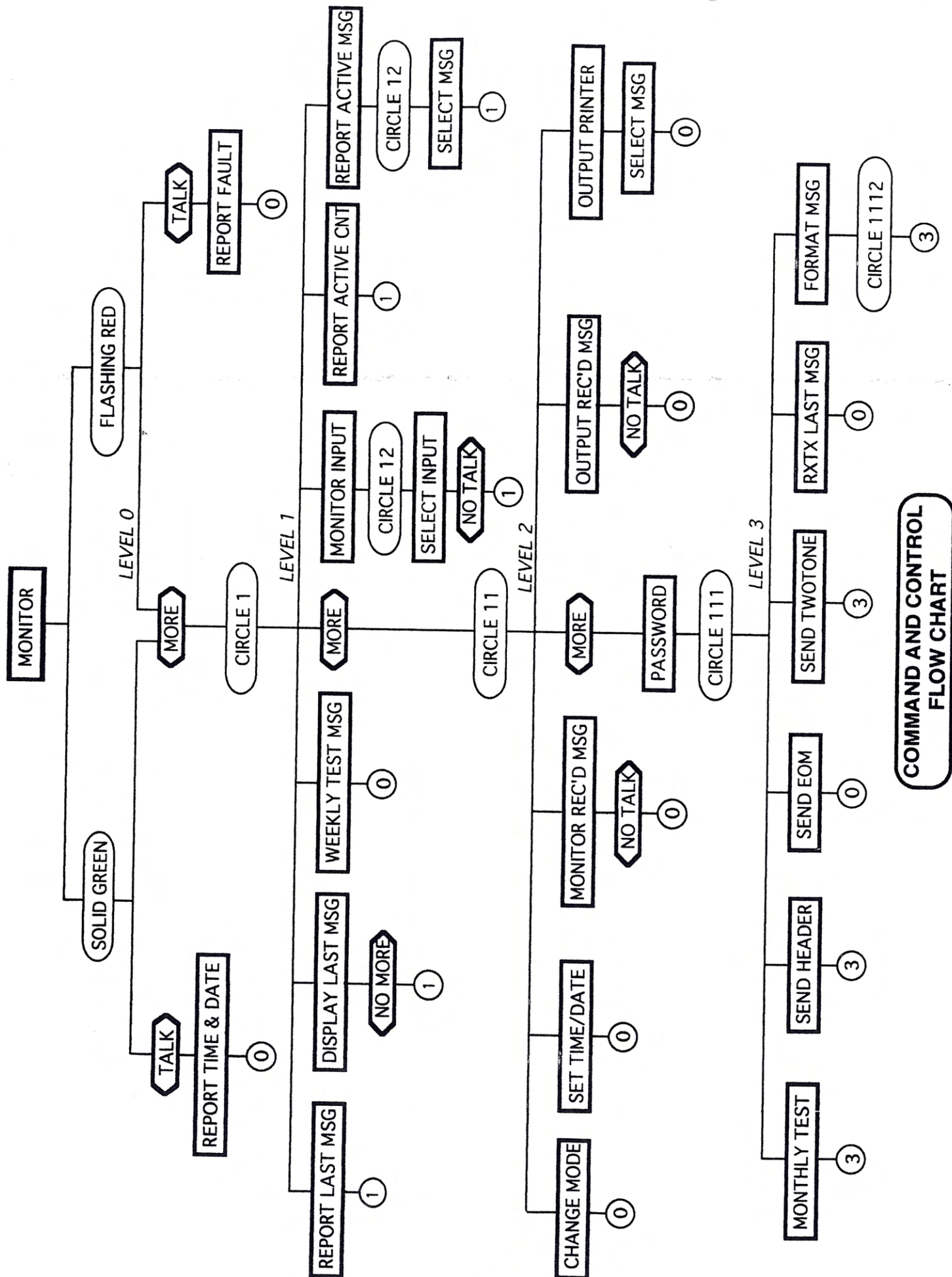
CIRCLE 2 → Indicates a position within a specific Level or Command Circle.

REPORT HOT MSG → Indicates a Speak and Command request point.

0 → Indicates a return to a specific level

COMMAND AND CONTROL FLOW CHART

Figure 5



Depression of the MORE key twice provides access to the second level of the commands for the HU-961 and displays the message "Circle 11" on the backlit viewing screen. This level enables the user to change the operation mode, time and date, and output the last received message.

CHANGE MODE

Allows the user to determine if he wants manual (override) or automatic control of the re-transmission capability of the HU-961. By selecting override, the user is able to manually control the re-transmission capability regardless of the host PC setup. Selection of the automatic mode, commands the HU-961 to follow the pre-programmed script.

SET TIME/DATE

Enables the user to set up the date using the 3-digit Julian format. Time is set to local time and when a message is transmitted, it is translated to 4-digit ZULU format.

MONITOR RECEIVED MESSAGE

Allows the user to listen to the audio portion of the last active EAS message. **IMPORTANT NOTE:** The HU-961 has the capability to store up to two minutes of the last EAS voice message. **HELPFUL HINT:** Depression of the NO and TALK keys terminates this option.

OUTPUT RECEIVED MESSAGE

Allows the user to output the last recorded message over the audio output port of the HU-961. **HELPFUL HINT:** Depression of the NO and TALK keys terminates this option.

OUTPUT PRINTER

Allows the user to print the header of the last active EAS message.

The third level of commands available from three depressions of the MORE key can only be accessed after entering a three digit password. The default password for the HU-961 when shipped from the factory is 1, 2, and 3. Upon accessing the third level, the voice prompt asks the user to enter the password. This is done by depressing the NO key the number of times corresponding to the first digit of the password. Depression of the YES key enters the digit and prompts the HU-961 to ask for the second digit. The NO key is then pressed corresponding to the second digit number. After depression of the YES key, the user is prompted for the third digit of the password. **IMPORTANT NOTE:** If the correct password is not received by the HU-961, the user is notified over the speaker. Depression of the MORE key allows the user to re-enter the correct password. Upon correct receipt of all three digits, the user has access to the third level of commands and "Circle 111" appears on the viewing screen. At this level, the user can SEND HEADER, SEND EOM, SEND TWOTONE, MONTHLY TEST, RE-TRANSMIT LAST MESSAGE, or FORMAT MESSAGE.

MONTHLY TEST	Allows the user to format for sending a monthly test EAS message
SEND HEADER	Allows the user to send a properly formatted headers portion of an EAS message
SEND EOM	Allows the user to send the EOM digital code portion of an EAS message
SEND TWOTONE	Allows the user to sent the TwoTone attention signal portion of an EAS message
RE-TRANSMIT LAST MESSAGE	Enable the user to re-transmit the last EAS message to the audio output of the HU-961
FORMAT MESSAGE	Allows the user to create an EAS message header by identifying and selecting the event (Thunderstorm Warning), the applicable county, and the effective time.

Host PC Monitoring...The Host PC has an option that allows the PC to monitor all communication from the HU-961. This option is configured by selecting the Real Time Operation column and selecting the Monitor mode. The HU-961 provides the user display of the header information of all received EAS messages. This information can be used for the integration of the HU-961 into an automated station operation. The Enhanced Operation section provides more information on this capability.

DIAGNOSTICS

This section covers the troubleshooting procedures for fault conditions that may occur during the setup or operation of the HU-961 Encoder/Decoder. The conditions list possible causes and the corrective action to take.

Blank Message Display

A blank MESSAGE DISPLAY while the HU-961 is on primary power is an indication of major malfunction. Take the HU-961 out of service and contact the location where the unit was purchased.

Blinking Alert LED

A blinking ALERT LED signifies that the system has detected a failure. Depression of the TALK key identifies the fault over the front panel speaker.

The message "NO AUDIO INPUT 1" signifies that the EAS message source connected to Audio input 1 is not present. The user should verify that the audio signal is present coming into the HU-961. If the signal is not at the input to the HU-961, the problem is external to the unit. If the signal is present at the input to the HU-961, the problem is within the unit. The HU-961 should be taken out of service and returned for repair.

IMPORTANT NOTE: If there is more than one system failure, depression of the TALK key will only announce the most important failure. Once the announced failure is corrected, depression of the TALK key will announce the next system failure.

Password Entry

It is necessary for the user to enter the password in a sequential method without trying to anticipate the next step. If the user enters the password without waiting for the HU-961 to complete its voice command, the password will not be accepted. If the password is not accepted, depression of the MORE key allows the user to re-enter the password.

ENHANCED OPERATION

This section of the manual provides several applications of the HU-961 enabling the user to utilize the HU-961 design to its fullest. A major feature of the HU-961 is the remote automation of the re-transmission of EAS messages. This can be performed through the use of the Digital Output signals on the I/O connector, or via the serial information transmitted over the COMM ports.

Automatic Transmission via Digital Output Control Signals

As previously discussed, there are three digital control signals on the I/O connector of the HU-961's rear panel. Two of these signals (Control Out and Alert Out) are outputs that are grounded when active. The third signal is the REMOTE START signal input.

For remote automation of the EAS re-transmission function, the user performs the following installation setup. The "Control Out" signal is wired to a switch box that is in-line between the program signal and the radio transmitter input. The user wires the "Audio Output" of the HU-961 as another input to the switch box. Figure 7 shows this configuration. For automatic interruption of the programming signal, the digital signal "Control Out" selects which input signal (regular programming or EAS message) is routed to the radio transmitter.

Transmission of the EAS message can be performed automatically as previously discussed, or by remote manual command. In the configuration where the user manually controls the re-transmission of an EAS message, the Digital Output signal, ALERT OUT, connects to a remotely located audible, or visual, device. This device alerts the user to an incoming EAS message. The user can then push a button that connects to the Digital Input signal on the I/O connector and commands the HU-961 to re-transmit the EAS message. The HU-961 then transmits out the Control Out signal switching the transmitter input from the programming audio to the EAS message.

Automatic Transmission via Serial Control Signals

The HU-961 has two serial ports that are typically connected to a printer for hard copy logging of all EAS messages, and to the host PC for HU-961 setup. The data format for the serial commands sent to the host PC is provided in Appendix B. At stations that are under computer control, this signal can be used to incorporate the automation of EAS message re-transmission. Through the development of a software subroutine, the user can interpret the HU-961 serial messages and re-transmit EAS messages as desired. The re-transmission of the EAS message is activated by the grounding of the HU-961's REMOTE START digital input signal. The computer would also switch the HU-961 Audio Out signal to the station transmitter.

Appendix A

Nature of Activation

Event or PIL code

National Codes:

Emergency Action Notification	EAN
Emergency Action Termination	EAT
National Information Center	NIC
National Periodic Test	NPT
Required Monthly Test	RMT
Required Weekly Test	RWT

Local Codes

Tornado Watch	TOA
Tornado Warning	TOR
Severe Thunderstorm Watch	SVA
Severe Thunderstorm Warning	SVR
Severe Weather Statement	SVS
Special Weather Statement	SPS
Flash Flood Watch	FFA
Flash Flood Warning	FFW
Flash Flood Statement	FFS
Flood Watch	FLA
Flood Warning	FLW
Flood Statement	FLS
Winter Storm Watch	WSA
Winter Storm Warning	WSW
Blizzard Warning	BZW
High Wind Watch	HWA
High Wind Warning	HWW
Hurricane Watch	HUA
Hurricane Warning	HUW
Hurricane Statement	HLS
Tsunami Watch	TSA
Tsunami Warning	TSW
Evacuation Immediate	EVI
Civil Emergency Message	CEM
Practive/Demo Warning	DMO
Administrative Message	ADR

Appendix B

HU-961 to Host PC Protocol

1. **Line Settings:** 2400 baud, 8 data bits, No parity, One stop bit.
2. **On-line Verification:** To verify that a communication link exist between the two units.
 - Host sends a "?" character to the HU-961.
 - HU-961 echos back the "?" within 500 msec.
3. **Data Transfer, Host to HU-961:** To transfer 1024 bytes of configuration data to the HU-961.
 - Host sends a "M" character to the HU-961. (Move command)
 - HU-961 sends an "A" character to the Host. (Acknowledge relay)
 - Host sends 1024 bytes of data to the HU-961 (data)
 - HU-961 echos back the 1024 bytes to the Host (data check)
 - **If data compares correctly:** Host sends an "A" character to HU-961.
 - **If data is incorrect:** Host retrys from beginning.
4. **Data Transfer, Host to HU-961:** To transfer EAS Message Header data and command an Encoder transmission.
 - Host sends a "Z" character to the HU-961.
 - HU-961 sends an "A" character to the Host.
 - Host sends a block of data bytes ending with an EOM (FFHex).
 - HU-961 sends an "A" character to the Host.
5. **Data Transfer, Host to HU-961:** To command the transmission of the Two-Tone signal and the EAS EOM.
 - Host sends a "E" character for EOM to the HU-961.
 - Host sends a "T" character for Two-Tone to the HU-961.
 - HU-961 sends an "A" character to the Host.
6. **Data Transfer, HU-961 to Host:** To transfer EAS Message Header data received to the Host.
 - HU-961 sends a "Z" character to the Host.
 - Host sends an "A" character to the HU-961
 - HU-961 sends a block of data bytes ending with an EOM.

Julian Date Matrix (Leap Year)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day
1	1	32	61	92	122	153	183	214	245	275	306	336	1
2	2	33	62	93	123	154	184	215	246	276	307	337	2
3	3	34	63	94	124	155	185	216	247	277	308	338	3
4	4	35	64	95	125	156	186	217	248	278	309	339	4
5	5	36	65	96	126	157	187	218	249	279	310	340	5
6	6	37	66	97	127	158	188	219	250	280	311	341	6
7	7	38	67	98	128	159	189	220	251	281	312	342	7
8	8	39	68	99	129	160	190	221	252	282	313	343	8
9	9	40	69	100	130	161	191	222	253	283	314	344	9
10	10	41	70	101	131	162	192	223	254	284	315	345	10
11	11	42	71	102	132	163	193	224	255	285	316	346	11
12	12	43	72	103	133	164	194	225	256	286	317	347	12
13	13	44	73	104	134	165	195	226	257	287	318	348	13
14	14	45	74	105	135	166	196	227	258	288	319	349	14
15	15	46	75	106	136	167	197	228	259	289	320	350	15
16	16	47	76	107	137	168	198	229	260	290	321	351	16
17	17	48	77	108	138	169	199	230	261	291	322	352	17
18	18	49	78	109	139	170	200	231	262	292	323	353	18
19	19	50	79	110	140	171	201	232	263	293	324	354	19
20	20	51	80	111	141	172	202	233	264	294	325	355	20
21	21	52	81	112	142	173	203	234	265	295	326	356	21
22	22	53	82	113	143	174	204	235	266	296	327	357	22
23	23	54	83	114	144	175	205	236	267	297	328	358	23
24	24	55	84	115	145	176	206	237	268	298	329	359	24
25	25	56	85	116	146	177	207	238	269	299	330	360	25
26	26	57	86	117	147	178	208	239	270	300	331	361	26
27	27	58	87	118	148	179	209	240	271	301	332	362	27
28	28	59	88	119	149	180	210	241	272	302	333	363	28
29	29	60	89	120	150	181	211	242	273	303	334	364	29
30	30		90	121	151	182	212	243	274	304	335	365	30
31	31		91		152		213	244		305		366	31
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day